《Universal and Unified Field Theory》
4. General Asymmetric Fields of Ontology and Cosmology

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Abstract: By discovering *Asymmetric World Equations*, this manuscript formulates astonishing results to represent a consequence of the laws of asymmetric conservations and commutations, and characterize universal evolutions and motion dynamics of *Ontology* and *Cosmology* as the following remarks:

a) *Asymmetric Principles* of *Cosmic Commutations, General Relativity* and *Physical* Horizon *Cosmology*

b) Laws of Conservation of Asymmetric Dynamics

c) *Ontological Potential Equations*, *Conservation of Cosmic Ontology* and *World-line Horizon Equations*

d) *Cosmic Field Equations, Conservation of Cosmic Motion Dynamics* and *Spacetime Horizon Equations*

As a result, it reveals that the virtual world supplies energy resources and modulates the messaging secrets of the intrinsic operations, beyond *General Relativity.*

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INTRODUCTION

In reality, the laws of nature strike aesthetically a harmony of duality not only between Y^-Y^+ symmetries, but also between symmetry and asymmetry. Because of the Y^-Y^+ duality, a symmetric system naturally consists of asymmetric ingredients or asymmetric constituents. Symmetry that exists in one horizon can be cohesively asymmetric in the other simultaneously without breaking its original ground symmetric system that coexists with its reciprocal opponents. A universe finely tuned, almost to absurdity, is a miracle of asymmetry and symmetry together that give rise to the next horizon where a new symmetry is advanced and composed at another level of consistency and perpetuation. Similar to the Y^-Y^+ flux commutation and continuity of potential densities, a duality of symmetry and asymmetry represents the cohesive and progressive evolutions aligning with the working of the topological hierarchy of our nature.

In physics, we define two types of asymmetric dynamics: *Ontology* for the massless objects, and *Cosmology* for massive matters with the further interrelations as the following:

1) Because of the massless phenomena or dark objects, *Ontology* is intrinsic, evolutionary, dominant and explicit at the first and second horizons. As the actions of the scalar potential fields, it characterizes interrelationships of the living types, properties, and the natural entities that exist in a primary domain of being, becoming, existence, or reality. It compartmentalizes the informational discourse or theory required for sets of formulation and establishment of the relationships between creation and reproduction, and between animation and annihilation.
2) *Cosmology* is the living behaviors, motion dynamics, and interrelationships of the large scale natural matter or supernovae that exist in the evolutionary and eventual trends of the universe as a whole. At the third horizon and beyond, the vector potentials compartmentalizes the infrastructural discourse or theory required for sets of formulation and constitution of the relationships between motion and dynamics, and between universal conformity and hierarchy.

The scope of this manuscript is at where, based on *universal symmetry*, a set of formulae is constituted of, given rise to and conserved for ontological and cosmological horizons *asymmetrically*. Through the performances of the Y^-Y^+ symmetric actions, laws of conservation and continuity determine the asymmetric properties of interruptive transformations, dynamic transportations, entangle commutations, photon, graviton or dark fields of *Ontology* and stellar galaxy evolutions of *Cosmology*.

XV. ASYMMETRIC WORLD EQUATIONS

Asymmetry is an event process capable of occurring at a different perspective to its symmetric counterpart. The natural characteristics of the Y^-Y^+ asymmetry have the following basic properties:

1) Associated with its opponent potentials of scalar fields, an asymmetric system is a dark fluxion flowing dominantly in one direction without its mirroring or equivalent fluxion from the other, although the interaction is a pair of Y^-Y^+ entanglements.
2) The scalar fields are virtual supremacy at the first and second horizons, where objects are the massless instances, actions or operations, known as dark energy. Conceivably, an asymmetric structure of physical system is always accompanied or operated by the dark energies.
3) Asymmetry is a part of components to the symmetric fluxions of the underlining transform and transport infrastructure cohesively and persistently aligning with its systematic symmetry.
4) As a duality of asymmetry, the Y^- or Y^+ anti-asymmetry is another part of components for the dual asymmetric fluxions of the base infrastructure consistently aligning with the underlying Y^- or Y^+ symmetry.
5) Both of the Y^- and Y^+ asymmetries have the laws of conservation consistently and perpetually, that orchestrate their respective continuity locally and harmonize each other's movements externally in progressing towards the next level of symmetry.

The *World Equations* of (5.7) [2] can be updated and generalized in terms of a pair of the Y^- and Y^+ asymmetric scalar fields, vector fields, matrix fields, and higher orders of the tensor fields, shown straightforwardly as or named as the third *World Equations*:

$$W_b = W_0^{\pm} + \sum_n h_n \left\{ \kappa_1 \big(\dot{\partial}_{\lambda 1}\big\rangle^{\pm} + \kappa_2 \dot{\partial}_{\lambda_2} \big(\dot{\partial}_{\lambda 1}\big\rangle_s^{\pm} + \kappa_3 \dot{\partial}_{\lambda_3} \big(\dot{\partial}_{\lambda 2}\big\rangle_v^{\pm} \cdots \right\} \qquad \textbf{(15.1)}$$

where κ_n is the coefficient of each order n of the λ^n event. Defined by (3.22-3.24), the symbol $(\ \rangle_o^{\mp}$ implies asymmetry of a Y^--supremacy or a Y^+-supremacy with the lower index s for scalar fields, v for vector fields and M for matrix tensors:

$$\big(\dot{\partial}_\lambda\big\rangle_s^+ \equiv \psi_n^+ \dot{\partial}_\lambda \psi_n^-, \qquad \big(\dot{\partial}_\lambda\big\rangle_s^- \equiv \psi_n^- \dot{\partial}_\lambda \psi_n^+ \qquad (15.2)$$

$$\big(\dot{\partial}_\lambda\big\rangle_v^+ \equiv \psi_n^+ \dot{\partial}_\lambda V_n^-, \qquad \big(\dot{\partial}_\lambda\big\rangle_v^- \equiv \psi_n^- \dot{\partial}_\lambda V_n^+ \qquad (15.3)$$

Because the above equations contain a pair of the scalar density fields $\varrho_\phi^{\pm n} = \psi_n^{\mp} \psi_n^{\pm}$ or vector fluxions $\mathscr{J}_v^{\pm n} \propto \psi^{\mp} V^{\pm}$ as one-way commutation without the symmetric engagement from a pair of its reciprocal fields, they institute the fluxion fields as Y^--asymmetry or Y^+-asymmetry, complementarily.

For asymmetric evolutions or acceleration forces, the underlying system of the symmetric commutations and continuities do not change, but the motion dynamics of the world lines as a whole changes. In this view, the Y^-Y^+ entanglements are independent or superposition at each of the "ontological" primacy during their formations. Obviously, asymmetry occurs when a fluxion flows without a correspondence to its mirroring opponent. In reality, as a one-way streaming of a supremacy, an Y^- or Y^+ asymmetric fluxion is always consisted of, balanced with, and conserved by its conjugate potentials as a reciprocal opponent, resulting in motion dynamics, creation, annihilation, animation, reproduction, etc.

As a part of the symmetric components, fluxions not only are stable and consistent but also can dictate its own system's fate by determining its dynamic motion lines taken on the world planes. Therefore, the two entanglers have the freedom to control each of their own operations, asynchronously, independently and cohesively - another stunning example of the workings of the remarkable nature of our universe.

XVI. DYNAMIC FRAMEWORK OF COMMUTATIONS

For asymmetric fluxions, the entangling invariance requires that their fluxions are conserved with motion acceleration, operated for creation and annihilation, or maintained by reactive forces. Normally, the divergence of Y^- fluxion is conserved by the virtual forces 0^+ and the divergence of Y^+ fluxion is balanced by physical motion of dynamic curvature. Together, they maintain each other's conservations and commutations cohesively, reciprocally or complementarily.

Under the environment of both Y^-Y^+ manifolds for a duality of fields, the event λ initiates its parallel transport and communicates along a direction at the first tangent vectors of each Y^+ and Y^- curvatures. Following the tangent curvature, the event λ operates the effects transporting $(\check{\partial}^\lambda, \hat{\partial}_\lambda)$ into its opponent manifold through the second tangent vectors of each curvature, known as *Normal Curvature or* perpendicular to the fist tangent vectors. The scalar communicates are defined by the *Commutator* and continuity *Bracket* of the (3.17-3.21) equations [2]. From two pairs of the scalar fields (15.2-3), asymmetric fluxions consist of and operate a pair of the commutative entanglements consistently and perpetually. Similar to the derivative of the formulae (10.2, 10.4), the Y^-Y^+ acceleration fields contrive a pair of the following commutations, equivalent to equations (6.22, 6.23).

$$\mathbf{g}_a^-/\kappa_g^- = \left[\check{\partial}^\lambda\check{\partial}^\lambda, \hat{\partial}_\lambda\hat{\partial}_\lambda\right]_x^- + \zeta^+ \qquad : \zeta^+ = \left(\hat{\partial}_\lambda(\check{\partial}^\lambda - \check{\partial}_\lambda)\right\rangle_x^+ \qquad \mathbf{(16.1)}$$

$$\mathbf{g}_x^+/\kappa_g^+ = \left[\check{\partial}_\lambda\check{\partial}_\lambda, \hat{\partial}^\lambda\hat{\partial}^\lambda\right]_x^+ + \zeta^- \qquad : \zeta^- = \left(\hat{\partial}^\lambda(\check{\partial}^\lambda - \check{\partial}_\lambda)\right\rangle_x^- \qquad \mathbf{(16.2)}$$

where the index x refers to the scalar or vector potentials. Named as the ***Third Universal Field Equations***, introduced at 2:00am September 3rd 2017 *Washington, DC* USA, the general formulae is balanced by a pair of commutation of the asymmetric Y^-Y^+ entanglers $\zeta^\mp$ that constitutes the laws of conservations universal to all types of Y^-Y^+ interactive motions, curvatures, dynamics, forces, accelerations, transformations, and transportations on the world lines of the dual manifolds. Therefore, these two equations above outline and define the *General Asymmetric Equations*.

As the horizon quantity of an object, a vector field forms and projects its motion potentials to its surrounding space, arisen by or acting on its opponent through a duality of reciprocal interactions. Because of the vector transportation, both of the boost and spiral communications give rise to various tensors of the horizon fields aligned with the motions of dynamic curvatures and beyond. When an object has a rotation on the antisymmetric manifolds of the world $\{\mathbf{r} \pm i\,\mathbf{k}\}$ planes, the event naturally operates, constitutes or generates *Torsions*, twisting on the dual dynamic resources and appearing as the *Centrifugal* or *Coriolis* compulsion on the objects such as triplets of particles, earth, and solar system. At the third horizon, acting upon the vector fields of $\zeta^\mu D^\mu$ and $\zeta_\nu D_\nu$, the event operates and gives rise to the tangent curvatures and vector rotations of the communications, defined by the commutators of the (3.23-3.24) equations.

At the second horizon of the event evolutionary processes, the local tangent curvature of the potential vectors through the next tangent vector of the curvature, the λ events of the above $\hat{\partial}$ and $\check{\partial}$ operations, give rise to the *Third Horizon Fields*, shown by the ontological expressions:

$$\check{\partial}_\lambda\check{\partial}_\lambda\psi^- = \dot{x}_m\left(\partial_m - \overset{-}{\Gamma}{}^{s}_{nm}\right)\dot{x}_s\partial_s\psi^- \qquad (16.3)$$

$$\hat{\partial}^\lambda\hat{\partial}^\lambda\psi^+ = \dot{x}^\nu\left(\partial^\nu - \overset{+}{\Gamma}{}^{\sigma}_{m\nu}\right)\dot{x}^\sigma\partial^\sigma\psi^+ \qquad (16.4)$$

For mathematical convenience, the zeta-matrices are hidden and implied by the mappings to the derivatives of $\dot{x}^\nu$ and $\dot{x}^\nu$ as the relativistic transformations.

$$\hat{\partial}^\lambda : \dot{x}^\nu \mapsto \hat{\partial}_\lambda : \dot{x}_a\zeta^\nu \qquad \check{\partial}_\lambda : \dot{x}_m \mapsto \check{\partial}^\lambda : \dot{x}^\alpha\zeta_m \qquad (16.5)$$

The events operate the local actions in the tangent space of the scalar fields relativistically, where the scalar fields are given rise to the vector fields and its vector fields are further given rise to the matrix fields.

In a parallel fashion, through the tangent vector of the third curvature, the events of the full $\hat{\partial}$ and $\check{\partial}$ operation continuously entangle the vector fields and gives rise to the next horizon fields, shown by the cosmological formulae:

$$\check{\partial}_\lambda\check{\partial}_\lambda V_m = \dot{x}_\nu\left(\partial_\nu - \overset{-}{\Gamma}{}^{n}_{\mu\nu}\right)\dot{x}_n\left(\partial_n V_m - \overset{-}{\Gamma}{}^{s}_{mn}V_s\right) \qquad (16.6)$$

$$\hat{\partial}^\lambda\hat{\partial}^\lambda V^\mu = \dot{x}^n\left(\partial^n - \overset{+}{\Gamma}{}^{\nu}_{mn}\right)\dot{x}^\nu\left(\partial^\nu V^\mu - \overset{+}{\Gamma}{}^{\sigma}_{\mu\nu}V^\sigma\right) \qquad (16.7)$$

As an integrity, they perform full operational commutations of vector boosts and torque rotations operated between the Y^-Y^+ world planes. Because the event processes continue to build up the further operable and iterative horizons of the associated rank-n tensor fields, a chain of these reactions constitutes various domains, each of which gives rise to the distinct field entanglements, systematically, sequentially and simultaneously.

Artifact 16.1: Ontological Commutations. For entanglement between Y^-Y^+ manifolds, considering the parallel transport of a *Scalar* density of the fields $\rho{=}\psi^+\psi^-$ around an infinitesimal parallelogram. The chain of this reactions can be interpreted by (16.3, 16.4) to formulate a commutation framework of *Physical Ontology*. This entanglement consists of a set of the unique fields, illustrated by the following components of the *entangling commutators,* respectively:

$$\left[\check{\partial}_\lambda\check{\partial}_\lambda, \hat{\partial}^\lambda\hat{\partial}^\lambda\right]_s^- = \dot{x}_\nu\dot{x}_m\left(P_{\nu m} + G^{\sigma s}_{m\nu}\right) \qquad (16.10)$$

$$P_{\nu m} \equiv \frac{1}{\dot{x}_\nu\dot{x}_m}\left[(\dot{x}_\nu\partial_\nu)(\dot{x}_m\partial_m), (\dot{x}^\nu\partial^\nu)(\dot{x}^m\partial^m)\right]_s^- \qquad (16.11)$$

$$G^{\sigma s}_{m\nu} = \frac{1}{\dot{x}_\nu\dot{x}_m}\left[\dot{x}^\nu\overset{+}{\Gamma}{}^{\sigma}_{m\nu}\dot{x}^\sigma\partial^\sigma, \dot{x}_m\overset{-}{\Gamma}{}^{s}_{nm}\dot{x}_s\partial_s\right]_s^- \qquad (16.12)$$

$$\left[\hat{\partial}_\lambda\hat{\partial}_\lambda, \check{\partial}^\lambda\check{\partial}^\lambda\right]_s^+ : \;(\hat{\partial}^\lambda, \dot{x}^\nu) \mapsto (\hat{\partial}_\lambda, \dot{x}_a\zeta^\nu),\; (\check{\partial}_\lambda, \dot{x}_m) \mapsto (\check{\partial}^\lambda, \dot{x}^\alpha\zeta_m) \quad (16.13)$$

The *Ricci* curvature $P_{\nu\mu}$ is defined on any pseudo-*Riemannian* manifold as a trace of the *Riemann* curvature tensor, introduced in 1889 [5,10]. The $G^{s\sigma}_{m\nu}$ is a *Connection Torsion*, a rotational stress of the transportations.

Artifact 16.2: Ontological Dynamics. Considering a system $\zeta \mapsto \gamma$ in a free space or vacuum at the constant speed, the above equations become at the motion dynamics:

$$\left[\check{\partial}_\lambda\check{\partial}_\lambda, \hat{\partial}^\lambda\hat{\partial}^\lambda\right]_s^- = \dot{x}_\nu\dot{x}_m\left(\frac{R}{2}g_{\nu m} + G^{\sigma s}_{m\nu}\right) \qquad : \{\phi^-, \varphi^+\} \qquad (16.14)$$

$$P_{\nu m} = R_{\nu m} = \frac{R}{2}g_{\nu m} \qquad (16.15)$$

$$R_{\nu m} = \left[(\dot{x}_\nu\partial_\nu)(\dot{x}_m\partial_m), (\dot{x}^\nu\partial^\nu)(\dot{x}^m\partial^m)\right]_s^- \equiv R_{\nu m}(\hat{\partial}^\lambda, \check{\partial}_\lambda) \qquad (16.16)$$

$$G^{s\sigma}_{m\nu} = \overset{+}{\Gamma}{}^{s}_{m\nu}\partial^s - \overset{-}{\Gamma}{}^{\sigma}_{nm}\partial_\sigma \equiv G^{s\sigma}_{m\nu}(\hat{\partial}^\lambda, \check{\partial}_\lambda) \qquad (16.17)$$

Like the metric itself, the *Ricci* tensor R is a symmetric bilinear form on the tangent space of the manifolds. Both $R_{\nu m}$ and $G^{\sigma s}_{m\nu}$ are the residual tensors with the local derivatives $\{\hat{\partial}^\lambda, \check{\partial}_\lambda\}$. Similarly, its counterpart exists as the following:

$$\left[\hat{\partial}_\lambda\hat{\partial}_\lambda, \check{\partial}^\lambda\check{\partial}^\lambda\right]_s^+ = \dot{x}_\nu\dot{x}_m\left(\tilde{R}_{\nu m} + \tilde{G}^{s\sigma}_{\nu m}\right) \qquad : \{\phi^+, \varphi^-\} \qquad (16.18)$$

$$\tilde{R}_{\nu m} = R_{\nu m}(\hat{\partial}_\lambda, \check{\partial}^\lambda) \qquad \tilde{G}^{\sigma s}_{\nu m} = G^{\sigma s}_{\nu m}(\hat{\partial}_\lambda, \check{\partial}^\lambda) \qquad (16.19)$$

$$\hat{\partial}_\lambda = X^\sigma{}_\nu \partial^\sigma, \qquad \check{\partial}^\lambda = X_\sigma{}^\nu \partial_\sigma \tag{16.20}$$

where the *Ricci* curvature $R_{\nu m}$ and connection torsion $G^{s\sigma}_{\nu m}$ are mapped to the event transformations $\{\hat{\partial}_\lambda, \check{\partial}^\lambda\}$. Both $\tilde{R}_{\nu m}$ and $\tilde{G}^{s\sigma}_{m\nu}$ are the interactive tensors with the relativistic derivatives $\{\hat{\partial}_\lambda, \check{\partial}^\lambda\}$. The curvature measures how movements ($\dot{x}$ and $\ddot{x}$) under the Y^-Y^+ *Scalar Fields* $\{\phi^-, \varphi^+\}$ and $\{\phi^+, \varphi^-\}$ are balanced with the inherent stress $G^{s\sigma}_{m\nu}$ during a parallel transportation between the Y^-Y^+ manifolds. The equation represents the Y^-Y^+ *Scalar Commutation of Residual Entanglement.*

Artifact 16.3: Cosmological Commutations. In cosmology, the vector communications under physical primacy generally involve both boost and spiral movements entangling between the Y^-Y^+ manifolds. Considering the parallel transport around an infinitesimal parallelogram under the dual *Vector* fields of V^μ and V_m, the entanglements are given by (16.6, 16.7) as the following formulae:

$$\left[\check{\partial}_\lambda \hat{\partial}_\lambda, \hat{\partial}^\lambda \check{\partial}^\lambda\right]^-_v = \dot{x}_\nu \dot{x}_n \left(P_{\nu n} - R^\sigma_{n\nu s} + G^{s\sigma}_{n\nu} + C^{s\sigma}_{n\nu}\right) \tag{16.21}$$

$$P_{\nu n} = \frac{1}{\dot{x}_\nu \dot{x}_n}\Big[(\dot{x}_\nu \partial_\nu)(\dot{x}_n \partial_n),\, (\dot{x}^n \partial^n)(\dot{x}^\nu \partial^\nu)\Big]^-_v \tag{16.22}$$

$$R^\sigma_{n\nu s} = \frac{1}{\dot{x}_\nu \dot{x}_n}\Big[\dot{x}_\nu \partial_\nu (\dot{x}_n \overset{-}{\Gamma}{}^s_{\nu n}),\, \dot{x}^n \partial^n (\dot{x}^\nu \overset{+}{\Gamma}{}^\sigma_{n\nu})\Big]^-_v \tag{16.23}$$

$$G^{s\sigma}_{n\nu} = \frac{1}{\dot{x}_\nu \dot{x}_n}\Big[\dot{x}^\nu \overset{+}{\Gamma}{}^\sigma_{n\nu} \dot{x}_n \partial_n,\, \dot{x}_n \overset{-}{\Gamma}{}^s_{\nu n} \dot{x}^\nu \partial^\nu\Big]^-_v \tag{16.24}$$

$$C^{s\sigma}_{n\nu} = \frac{1}{\dot{x}_\nu \dot{x}_n}\Big[\dot{x}_\nu \overset{-}{\Gamma}{}^\alpha_{n\nu} \dot{x}_n \overset{-}{\Gamma}{}^s_{\nu n},\, \dot{x}^n \overset{+}{\Gamma}{}^a_{\nu n} \dot{x}^\nu \overset{+}{\Gamma}{}^\sigma_{n\nu}\Big]^-_v \tag{16.25}$$

$$\left[\hat{\partial}_\lambda \check{\partial}_\lambda, \check{\partial}^\lambda \hat{\partial}^\lambda\right]^+_v : \ (\hat{\partial}^\lambda, \dot{x}^\nu) \mapsto (\hat{\partial}_\lambda, \dot{x}_a \zeta^\nu),\ (\check{\partial}_\lambda, \dot{x}_m) \mapsto (\check{\partial}^\lambda, \dot{x}^\alpha \zeta_m) \tag{16.26}$$

The matrix $P_{\nu n}$ is defined as the *Growth Potential*, an entanglement capacity of the dark energies; $R^\sigma_{n\nu s}$ as *Transport Curvature*, a routing track of the communications; $G^{s\sigma}_{n\nu}$ as *Connection Torsion*, a stress energy of the transportations; and $C^{s\sigma}_{n\nu}$ as *Entangling Connector,* a connection of dark energy dynamics. Therefore, this framework represents a foundation of physical cosmology at the horizon commutations.

Artifact 16.4: Cosmological Dynamics. Consider an object observed externally and given by the (16.6, 16.7) equations that actions of the commutation are dominant towards the residual entanglement $\left[\check{\partial}_\lambda \hat{\partial}_\lambda, \hat{\partial}^\lambda \check{\partial}^\lambda\right]^-_v$. Following the similar commutation infrastructure of the above equations, the event operations contract directly to the manifold communications and the commutation relations of equation (16.21, 16.26) are simplified to:

$$\left[\check{\partial}_\lambda \hat{\partial}_\lambda, \hat{\partial}^\lambda \check{\partial}^\lambda\right]^-_v = \dot{x}_n \dot{x}_\nu \left(\frac{R}{2} g_{n\nu} - R^\sigma_{n\nu s} + G^{\sigma s}_{n\nu} + C^{s\sigma}_{n\nu}\right) \tag{16.27}$$

$$R_{\nu m} = \left[(\dot{x}_\nu \partial_\nu)(\dot{x}_m \partial_m), (\dot{x}^\nu \partial^\nu)(\dot{x}^m \partial^m)\right]^-_s = \frac{R}{2} g_{\nu m} \tag{16.28}$$

$$R^\mu_{n\nu\sigma} = -\left(\partial_\nu \overset{-}{\Gamma}{}^\mu_{a\sigma} \partial_a \overset{+}{\Gamma}{}^\mu_{\nu\sigma} + \overset{-}{\Gamma}{}^\rho_{a\sigma} \overset{+}{\Gamma}{}^\mu_{\nu\rho} - \overset{+}{\Gamma}{}^\rho_{\nu\sigma} \overset{-}{\Gamma}{}^\mu_{a\rho}\right) \equiv R^\mu_{n\nu\sigma}(\hat{\partial}^\lambda, \check{\partial}_\lambda) \tag{16.29}$$

$$G^{s\sigma}_{n\nu} = \overset{+}{\Gamma}{}^s_{n\nu} \partial^s - \overset{-}{\Gamma}{}^\sigma_{\nu n} \partial_\sigma \equiv G^{s\sigma}_{n\nu}(\hat{\partial}^\lambda, \check{\partial}_\lambda) \tag{16.30}$$

$$C^{s\sigma}_{n\nu} = \overset{-}{\Gamma}{}^s_{m\nu} \overset{+}{\Gamma}{}^\sigma_{\nu n} - \overset{+}{\Gamma}{}^\sigma_{\nu n} \overset{-}{\Gamma}{}^s_{m\nu} \equiv C^{s\sigma}_{n\nu}(\hat{\partial}^\lambda, \check{\partial}_\lambda) \tag{16.31}$$

$$\left[\check{\partial}^\lambda \check{\partial}^\lambda, \hat{\partial}_\lambda \hat{\partial}_\lambda\right]^+_v = \dot{x}_n \dot{x}_\nu \left(\tilde{R}^-_{n\nu} - \tilde{R}^\sigma_{n\nu s} + \tilde{G}^{s\sigma}_{n\nu} + \tilde{C}^{s\sigma}_{n\nu}\right) \tag{16.32}$$

$$\tilde{R}^-_{\nu m} = R^-_{\nu m}(\hat{\partial}_\lambda, \check{\partial}^\lambda),\ \tilde{R}^\sigma_{n\nu s} = R^\sigma_{n\nu s}(\hat{\partial}_\lambda, \check{\partial}^\lambda) \qquad : \hat{\partial}_\lambda = L^+_{\sigma\nu} \partial^\sigma \tag{16.33}$$

$$\tilde{G}^{s\sigma}_{\nu m} = G^{s\sigma}_{\nu m}(\hat{\partial}_\lambda, \check{\partial}^\lambda),\ \tilde{C}^{s\sigma}_{\nu m} = C^{s\sigma}_{\nu m}(\hat{\partial}_\lambda, \check{\partial}^\lambda) \qquad : \check{\partial}^\lambda = L^-_{\sigma\nu} \partial_\sigma \tag{16.34}$$

where $L^\mp_{\sigma\nu}$ is the *Lorentz* group (8.12). More precisely, the event presences of the Y^-Y^+ dynamics manifests infrastructural foundations and transportations of the potential, curvature, stress, torsion, and contorsion, which give rise to the interactional entanglements through the center of an object by following its geodesics of the underlying virtual and physical commutations. Generally, transportations between Y^-Y^+ manifolds are conserved dynamically.

Artifact 16.5: Classical General Relativity. For a statically frozen or inanimate state, the two-dimensions of the world line can be aggregated in the expression $R^\sigma_{n\nu s} \mapsto R_{n\nu}$, $C^{s\sigma}_{n\nu} \mapsto C_{n\nu}$ and $G^{s\sigma}_{n\nu} \mapsto G_{n\nu}$. Therefore, the above equation formulates *General Relativity*:

$$G_{n\nu} = R_{n\nu} - \frac{1}{2} R g_{n\nu} \qquad : \left[\check{\partial}^\lambda \check{\partial}^\lambda, \hat{\partial}_\lambda \hat{\partial}_\lambda\right]^+_v = 0,\ C_{n\nu} = 0 \tag{16.35}$$

or $$R_{\mu\nu} + \Lambda g_{\mu\nu} = \tfrac{1}{2} R g_{\mu\nu} + G_{\mu\nu} \qquad : G_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu} \tag{16.36}$$

known as the *Einstein* field equation [6], discovered in November 1915. The theory had been one of the most profound discoveries of the 20th-century physics to account for general commutation in the context of classical forces. Thirty-four years after Einstein's discovery of *General Relativity*, he claimed, "The general theory of relativity is as yet incomplete .... We do not yet know with certainty, by what mathematical mechanism the total field in space is to be described and what the general invariant laws are to which this total field is subject." Next year in 1950, he restated "... all attempts to obtain a deeper knowledge of the foundations of physics seem doomed to me unless the basic concepts are in accordance with general relativity from the beginning." [1]. It turns out to be impossible to find a general definition for a seemingly simple property such as a system's total mass (or energy). The main reason is that the gravitational field—like any physical field—must be ascribed a certain energy, but that it proves to be fundamentally impossible to localize that energy [9]. Apparently, for a century, the philosophical interpretation had remained a challenge or unsolved, until this *Universal Topology* [2] was discovered in 2016, representing an integrity of philosophical and mathematical solutions to extend further beyond general relativity to include the obvious phenomenons of cosmological photon and graviton transportation, blackhole radiation, and dark energy modulation.

Artifact 16.6: Contorsion Tensor. In 1955, *Einstein* stated that "...the essential achievement of general relativity, namely to overcome 'rigid' space (i.e. the inertial frame), is only indirectly connected with the introduction of a *Riemannian* metric. The directly relevant conceptual element is the 'displacement field' Γ^l_{ik}, which expresses the infinitesimal displacement of vectors. It is this which replaces the parallelism of spatially arbitrarily separated vectors fixed by the inertial frame (i.e. the equality of corresponding components) by an infinitesimal operation. This makes it possible to construct tensors by differentiation and hence to dispense with the introduction of 'rigid' space (the inertial frame). In the face of this, it seems to be of secondary importance in some sense that some particular Γ field can be deduced from a *Riemannian* metric..." [6]. In this special case, stress tensor $G^\mu_{\nu\sigma}$ of an object vanishes from or immune to its external fields while its internal commutations conserve a contorsion tensor of $T^\mu_{\sigma\nu}$ as a part of the life entanglements:

$$T^\mu_{\sigma\nu} = \overset{-}{\Gamma}{}^\mu_{\sigma\nu} - \overset{+}{\Gamma}{}^\mu_{\sigma\nu} \qquad : G^\mu_{\nu\sigma} \mapsto T^\mu_{\sigma\nu} \partial_\nu = \left(\overset{-}{\Gamma}{}^\mu_{\sigma\nu} - \overset{+}{\Gamma}{}^\mu_{\sigma\nu}\right) \partial_\nu \tag{16.37}$$

This extends the meaning to and is known as *Élie Cartan Torsion*, proposed in 1922 [7]. Besides spin generators, this tensor carries out the additional degrees of freedom for internal communications.

Artifact 16.7: Classical Physical Cosmology. During 1920s, *Alexander Friedmann, Georges Lemaître, Howard Robertson and Arthur Walker* (FLRW) derived a set of equations that govern the universe the expansion of space in all directions (isotropy) and from every location (homogeneity) within the context of general relativity. The FLRW model declares the cosmological principle as that a universe is in homogeneous, isotropic, and filled with ideal fluid [13]. For a generic synchronous metric in that universe, a solution to *Einstein's* field equation in a spacetime is expressed as a pair of the *Friedmann* equations with *Hubble* parameter:

$$ds^2 = (c\,dt)^2 - a(t)^2 \left[\frac{dr^2}{1 - kr^2} + r^2 (d\theta^2 + \sin^2\theta\, d\phi^2)\right] \tag{16.38}$$

$$\frac{3}{c^2}\left(\frac{\dot{a}}{a}\right)^2 + 3\frac{k}{a^2} = \Lambda + \frac{8\pi G}{c^2}\rho \tag{16.39}$$

$$\frac{2}{c^2}\frac{\ddot{a}}{a} + \frac{1}{c^2}\left(\frac{\dot{a}}{a}\right)^2 + \frac{k}{a^2} = \Lambda - \frac{8\pi G}{c^4} p \tag{16.40}$$

$$v_r = H(t_0) D,\ \ H(t) \equiv \frac{\dot{a}}{a} \qquad : H_0 = H(t_0),\ v_r = c\left(1 - \frac{\lambda_{emit}}{\lambda_{emit}}\right) \tag{16.41}$$

In cosmological observation, the movement rate of the universe is described by the model of time-dependent *Hubble* parameter $H(t)$ to describe a galaxy at distance D given by *Hubble Law*: $v_r = H_0 D$. For a constant cosmological constant Λ, the equation (16.39) includes a single originating event, the mass density ρ. This is what appear as if that the universe were not an explosion but the abrupt appearance of expanding spacetime metric.

Artifact 16.8: Laws of Conservation of Asymmetric Dynamics. For convenience of expression, it is articulated by each of four distinctive conceptions that deliver the *Laws of Conservation and Commutation Equations* characterizing universal evolutions as each of the above subjects, namely: i) *Creation,* ii) *Reproduction,* iii) *Animation*, and iv) *Annihilation*. A consequence of these laws of conservations and commutations is that the perpetual motions, transformations, or transportations on the world line curvatures can exist only if its motion dynamics of energies are conserved, or that, without virtual symmetric and asymmetric fluxions, no system can deliver unlimited time of movements throughout its surroundings. Carried out by equations of (16.1, 16.2), each of the *Laws of Conservation of Asymmetric Dynamics* is presented in the next two chapters.

XVII. ONTOLOGICAL POTENTIAL EQUATIONS

The asymmetric commutation is operated by one of the interpretable, residual features exchanging the information carried by the scalar fields (16.1)-(16.2):

$$\left[\check{\partial}_\lambda \check{\partial}_\lambda, \hat{\partial}^\lambda \hat{\partial}^\lambda\right]_s^+ = -\left(\hat{\partial}^\lambda(\check{\partial}^\lambda - \check{\partial}_\lambda)\right\rangle_s^- \qquad : \{\phi^-, \varphi^+\} \tag{17.1}$$

$$\left[\check{\partial}^\lambda \check{\partial}^\lambda, \hat{\partial}_\lambda \hat{\partial}_\lambda\right]_s^- = -\left(\hat{\partial}_\lambda(\check{\partial}^\lambda - \check{\partial}_\lambda)\right\rangle_s^+ \qquad : \{\phi^+, \varphi^-\} \tag{17.2}$$

where the index s refers to the scalar potentials. The first equation is the physical animation and reproduction of asymmetric ontology, and the second equation is the virtual creation and annihilation of asymmetric ontology. As a general expectation, the asymmetric motion of ontology features that i) *Residual Entanglement* closely resembles the objects under a duality of the real world; and ii) *Transformational Dynamics* operates the processes under the event actions. As a notation, this chapter was introduced at September 9th of 2018.

From definitions of the *ζ-Matrices* (8.4), one can convert each of the right-side equations of the above asymmetric scalar entanglers explicitly under the second horizon at the constant speed:

$$\mathcal{O}_{\nu m}^{+\sigma} \equiv -\dot{x}^\sigma \zeta^0 \partial^\sigma\left(\dot{x}^\nu \zeta_2 \partial_\nu - \dot{x}_m \zeta_3 \partial_m\right\rangle_s^- \qquad : \{\phi^-, \varphi^+\} \tag{17.3}$$

$$\mathcal{O}_{\nu m}^{-\sigma} \equiv -\dot{x}_\sigma \zeta^1 \partial^\sigma\left(\dot{x}^\nu \zeta_2 \partial_\nu - \dot{x}_m \zeta_3 \partial_m\right\rangle_s^+ \qquad : \{\phi^+, \varphi^-\} \tag{17.4}$$

The $\mathcal{O}_{\nu m}^{\pm\sigma}$ is the Y^+ or Y^- ontological modulators. Illustrated by equations of (16.14, 16.18), the ontological dynamics can now be fabricated in the covariant form of asymmetric ontology:

$$\frac{R}{2} g_{\nu m} + G_{\nu m}^{\sigma s} = \mathcal{O}_{\nu m}^{+\sigma} \qquad : \zeta_\nu = \gamma_\nu + \chi_\nu \tag{17.5}$$

$$\tilde{R}^{\nu m} + \tilde{G}_{\nu m}^{\sigma s} = \mathcal{O}_{\nu m}^{-\sigma} \qquad : \zeta^\nu = \gamma^\nu + \chi^\nu \tag{17.6}$$

Named as *Field Equations of Cosmic Ontology*, the first equation at the Y^--supremacy is affiliated with the *physical Annihilation of Ontological processes*. The second equation at the Y^+-supremacy is the conservation inherent in the *Virtual Creation of Ontological processes*. Apparently, the creation processes are much more sophisticated because of the message transformations, relativistic commutations, and dynamic modulations.

With the scalar potentials, the $Y^\pm$ events conjure up the entanglements of eternal fluxions as a perpetual streaming for residual motions traveling on curvatures of the world lines, which is the persistence of an object without deviation in its situation of movements at its state and energies. The term $\mathcal{O}_{\nu m}^{-\sigma}$ or $\mathcal{O}_{\nu m}^{+\sigma}$ implies the left- or right-hand helicity and modulations balanced to its opposite motion curvatures. Classically, the term "residual" is described by or defined as: an object is not subject to any net external forces and moves at conservation of energy fluxions on the world planes, relativistically. This means that an object continues its Y^-Y^+ interweaving at its current states superposable until some interactions or modulations causes its state or energy to change.

Artifact 17.1: Transformation of Ontological Modulators. Considering the *Infrastructural Matrices* $\zeta = \gamma + \chi$, $\gamma^0\gamma^\nu = \gamma^\nu$, $\gamma^1\gamma^2 = i\gamma^3$ and $\gamma^1\gamma^3 = i\gamma^2$, the property for the gamma matrices to generate a *Clifford* algebra is the continuity relation $\langle\gamma^\nu, \gamma^\mu\rangle = 2\eta^+ I_4$. One can convert the ζ-matrix explicitly into the asymmetric scalar entanglers. The (7.3-4) equations can be shown by the vector matrixes:

$$\mathcal{O}_{\nu\mu}^{+\sigma} = \mathcal{O}_d^+ - \kappa_o^+ (\partial^t \quad \mathbf{u}^+\nabla) \begin{pmatrix} 0 & \mathbf{D}_a^+ \\ -\mathbf{D}_a^* & \frac{\mathbf{u}^+}{c^2} \times \mathbf{H}_a^+ \end{pmatrix} \tag{17.7}$$

$$\mathcal{O}_{\nu m}^{-\sigma} = \mathcal{O}_d^- - \kappa_o^- (\partial^t \quad \mathbf{u}^-\nabla) \begin{pmatrix} 0 & \mathbf{B}_a^- \\ -\mathbf{B}_a^* & \frac{\check{\mathbf{b}}}{c} \times \mathbf{E}_a^- \end{pmatrix} \tag{17.8}$$

where $\kappa_o^\pm$ is a pair of the constants. The $\mathbf{D}_a^*$, $\mathbf{D}_a^+$, $\mathbf{E}_a^-$, $\mathbf{B}_a^*$, $\mathbf{B}_a^-$ and $\mathbf{H}_a^+$ fields are not only the complex functions but also the intrinsic modulations in the form of a duality of asymmetry cohesively and and implicitly. It might appear similar to but functionally different from the electromagnetic fields in the form of a duality of asymmetry. The vector components can be expressed as the area flow of energy density and current:

$$\mathcal{O}_{\nu\nu}^{+\sigma} = \mathcal{O}_d^+ - \kappa_o^+ \begin{pmatrix} -(\mathbf{u}^+\nabla)\cdot\mathbf{D}_a^* \\ \frac{\partial}{\partial t}\mathbf{D}_a^+ + \frac{\mathbf{u}^+}{c}\nabla\left(\frac{\mathbf{u}^+}{c} \times \mathbf{H}_a^+\right) \end{pmatrix} \tag{17.9}$$

$$\mathcal{O}_{\nu\nu}^{-\sigma} = \mathcal{O}_d^- - \kappa_o^- \begin{pmatrix} -(\mathbf{u}^-\nabla)\cdot\mathbf{B}_a^* \\ \frac{\partial}{\partial t}\mathbf{B}_a^- + \frac{1}{c}\mathbf{u}^-\nabla \times \mathbf{E}_a^- \end{pmatrix} \tag{17.10}$$

Apparently, the ontological process, $\left(\partial^\nu + ieA^\nu/\hbar\right)$ and $\left(\partial_\nu - ieA_\nu/\hbar\right)$ is primarily the superphase A^ν and A_ν operations as the resource supplier or modular of the off-diagonal matrices for the asymmetric dynamics. Meanwhile, it generates the light and gravitational waves $\Diamond^\pm$ from their diagonal elements. The Y^-Y^+ events conjure up the entanglements of eternal fluxions as another perpetual streaming for transportations on the world-line curvatures. The vector components in the above matrices are source of the area flow of energy density and current:

$$\nabla \cdot \mathbf{D}_a^* = 4\pi G \rho_a \qquad : \kappa_o^+ = 2/c^3 \tag{17.11}$$

$$4\pi G \mathbf{J}_a^+ = \frac{\partial}{\partial t}\mathbf{D}_a^+ - \nabla \times \mathbf{H}_a^+ \tag{17.12}$$

where the formula, $\nabla \cdot (\mathbf{u} \times \mathbf{H}) = \mathbf{H} \cdot (\nabla \times \mathbf{u}) - \mathbf{u} \cdot (\nabla \times \mathbf{H})$, is applied at the constant speed. The torque transportation between the complex manifolds of the Y^-Y^+ world planes redefines the rotational quantities of how commutations between the dual spaces are entangled under the conjugation framework in two referential frames traveling at a consistent velocity with respect to one another. These equations are the transport dynamics affiliated with the physical *Reproduction and Animation* of the ontological processes. At the constant speed $\mathbf{u}^\pm = \mp c$, the ontological dynamics implies the two-dimensional motion curvatures be operated at the second horizon giving rise to the third horizon and transporting the entangling forces $\tilde{\chi}^\nu \mapsto \chi^\nu$ at the four-dimensional spacetime manifold.

Artifact 17.2: Conservation of Cosmic Ontology. For the simplicity of the math appearance, one may present the matrices as the following:

$$\mathbf{g}^- = g_{\nu m}, \qquad \mathbf{G} = G_{\nu m}^{\sigma s}, \qquad \mathbf{O}^+ = \mathcal{O}_{m\nu}^{+\sigma} \tag{17.13a}$$

$$\mathbf{g}^+ = g^{\nu m} \qquad \tilde{\mathbf{G}} = \tilde{G}_{\nu m}^{\sigma s}, \qquad \mathbf{O}^- = \mathcal{O}_{m\nu}^{-\sigma} \qquad \tilde{\mathbf{R}}^+ = \tilde{R}^{\nu m} \tag{17.13b}$$

At a free space or vacuum, the above equations derives the commutative formulae:

$$\frac{R}{2}\mathbf{g}^- + \mathbf{G} = \mathbf{O}^+ \tag{17.14}$$

$$\tilde{\mathbf{R}}^+ + \tilde{\mathbf{G}} = \mathbf{O}^- \tag{17.15}$$

As expected, the ontological *gamma*- and *chi*-fields are similar to or evolve into electromagnetic fields and gravitational fields. As the processes of the nature of being, the equations uncoil explicitly the compacted covariant formulae. Generally, the above conservation of ontological dynamics describe the following principles:

1) The ontological dynamics is conserved and carried out by the area densities for creations or annihilations, which serve as *Law of Conservation of Cosmic Ontology*.
2) In the world planes, the curvature R and stress tensor $G^{\sigma s}_{\nu m}$ is dynamically sustained during the asymmetric modulations over a spiral gesture of movements.
3) Without the *Riemannian* curvature $\mathfrak{R}^{\pm}=0$, it indicates that the system (such as a galaxy) is spiraling on the world lines and entangling through a modulation of the $\mathbf{O}^{\pm}$ matrix between the $Y^{-}Y^{+}$ manifolds at the second horizons.
4) Operated and maintained by the superphase potentials, the conservation of energy fluxions supplies the resources, modulates the transform, and transports potential messages or forces, alternatively.
5) The commutation fields of the superphase potentials transform and entangle between manifolds as the resource propagation of the asymmetric dynamics.
6) The torque fields of the superphase potentials transport and entangle between manifolds as the force generators of the ontological processes of motion dynamics.

Apparently, it represents that the resources are composited of, supplied by or conducted with the residual activators and motion modulators primarily in the virtual world. It implies that, in the physical world, the directly observable parameters are the coverture R, stress tensor $\mathbf{G}$ and wave propagation $\diamondsuit^{\pm}$. Aligning with the dual world-lines of the universal topology, the commutation of energy fluxions animates the resources, modulates messages of the potential transform and transports while performing actions or reactions.

Artifact 17.3: Ontological Accelerations. Connected to the Y^{-} or Y^{+} entanglement, the dynamic accelerations $\mathbf{g}^{\pm}_s$ of ontology are given by (17.1) and (17.2) as the following expression:

$$\mathbf{g}^{-}_s/\kappa^{-}_g=\left[\check{\partial}^{\lambda}\check{\partial}^{\lambda},\hat{\partial}_{\lambda}\hat{\partial}_{\lambda}\right]^{-}_s-\mathbf{O}^{+} \qquad :\kappa^{-}_g=\frac{\hbar c}{2E^{-}} \tag{17.16}$$

$$\mathbf{g}^{+}_s/\kappa^{+}_g=\left[\check{\partial}_{\lambda}\check{\partial}_{\lambda},\hat{\partial}^{\lambda}\hat{\partial}^{\lambda}\right]^{+}_s-\mathbf{O}^{-} \qquad :\kappa^{+}_g=\frac{\hbar c}{2E^{+}} \tag{17.17}$$

where $\kappa_g=1/(\hbar c)$ is a constance. For a system, its core center may absorb the objects when $\mathbf{g}^{+}_s>0$ and emits objects at $\mathbf{g}^{+}_s<0$. To maintain the stability at $\tilde{\mathbf{g}}_s=\mathbf{g}^{+}_s+\mathbf{g}^{-}_s$, the accelerations of a system might be conserved: $\mathbf{g}^{+}_s+\mathbf{g}^{-}_s=0$ and usually has to balance both a black core absorbing energies and a white core exert energies. Because the resources are primarily supplied by the virtual world where operates the residual activators and motion modulators, any life activities appear to be favorable towards the Y^{+} deceleration $\mathbf{g}^{+}_s<0$ for mass emission and balanced by the Y^{-} accelerations $\mathbf{g}^{-}_s>0$, known as *Hubble's* Law [8]. In other words, the energy conservation implies that the light emission at the second horizon might always be observable as the redshift or dispersive waves under a third horizon, which, however, is not *Doppler* shift [11]. The conservation of virtual and physical dynamics balances the expansion or reduction of the universe at the scale of both virtual and physical spaces. It is a property of the entire universe as a whole rather than a phenomenon that applies just to one part of the universe observable physically.

Artifact 17.4: World-line Horizon Equations. Since the ontological dynamics at the second horizon is on world planes with two-dimensional coordinates, the *Ricci* scalar is given by

$$R=-2\Big[\frac{1}{c^2}\frac{\ddot{a}}{a}+\frac{1}{c^2}\left(\frac{\dot{a}}{a}\right)^2+\frac{k}{a^2}\Big] \tag{17.18}$$

The energy momentum tensor $T_{\mu\nu}$ is similarly constraint as the *Ricci* scalar. It can only contain two independent functions of t and its components are

$$T_{00}=\rho_0(t),\quad T_{0t}=0 \qquad T_{\mu\nu}=p_0(t)g_{\mu\nu} \tag{17.19}$$

$$G_{tt}=\frac{8\pi G}{c^2}\rho_0,\qquad G_{rr}=\frac{8\pi G}{c^2}p_0 \tag{17.20}$$

The trace of the diagonal elements (17.11) of the equation (17.14) can be extracted and shown by the following:

$$\frac{\ddot{a}}{a}+\left(\frac{\dot{a}}{a}\right)^2+\frac{kc^2}{a^2}=\mathcal{O}^{+}_d+\frac{4\pi G}{c^2}(\rho c^2-p) \tag{17.21}$$

$$\rho=2\rho_0+\rho_a \qquad \rho_a=\frac{1}{4\pi G}\nabla\cdot\mathbf{D}^{*}_a \tag{17.22}$$

$$p=2p_0+p_a \qquad p_a=c^2Tr(\mathbf{J}^{+}_a) \tag{17.23}$$

$$4\pi G\mathbf{J}^{+}_a=\frac{\partial}{\partial t}\mathbf{D}^{+}_a-\nabla\times\mathbf{H}^{+}_a \tag{17.24}$$

Named as *World-line Horizon Equations*, they serve as conservation between the second and third horizons. One can further convert them to the following form:

$$\tilde{H}^2_2+\tilde{H}_2\tilde{H}_3+\frac{kc^2}{a^2}=\mathcal{O}^{+}_d+\frac{4\pi G}{c^2}(\rho c^2-p) \tag{17.25}$$

$$\tilde{H}_2=\frac{\dot{a}}{a},\qquad \tilde{H}_3=\frac{\ddot{a}}{\dot{a}} \qquad k=0 \tag{17.26}$$

where $\tilde{H}_2$ or $\tilde{H}_3$ is named the second or third horizon function of world-line manifolds, respectively. Because, the *density* and the *horizon fields* are a collection of the *complex states* asymmetrically, it implies an eternal yinyang-steady state universe in form of a spiral galaxy that dynamically orchestrates the mass, density, photon, graviton, thermodynamics, weak and strong forces, packed all together.

At near the third horizon, the curvature k might be zero. The horizon field equation becomes a quadratic equation, resolvable for the second horizon function $\tilde{H}_2$. Solving the quadratic equation $\tilde{H}^2_2+\tilde{H}_3\tilde{H}_2-K_2=0$, one has the roots for the second and third horizon function H_2 for the parameters as he following:

$$\tilde{H}_2=\frac{1}{2}\big(-\tilde{H}_3\pm\sqrt{\tilde{H}^2_3+4K_2}\big) \tag{17.27}$$

$$K_2\equiv K_2(\omega,T)=\mathcal{O}^{+}_d+\frac{4\pi G}{c^2}(\rho c^2-p) \tag{17.28}$$

Accordingly, because H_2 can be a complex function at the second horizon, the scalar metric $a(t)$ is a complex function, representing a harmonic duality of the $Y^{-}Y^{+}$ interwoven dynamics for life streams entangling on both of *World Planes*. Therefore, the equation (17.21) is contradict to the hypothesis that the universe described by the equation (16.39) implies abrupt appearance of expanding spacetime metric.

XVIII. COSMIC FIELD EQUATIONS

At the third horizon or higher, the energy potentials embodied at the mass enclave conserve the asymmetric commutations as one of the transient astronomical events and features propagation of the curvature dynamics carried by the vector fields, shown by a pair of the commutative equations (16.1, 16.2):

$$\left[\check{\partial}_{\lambda}\check{\partial}_{\lambda},\hat{\partial}^{\lambda}\hat{\partial}^{\lambda}\right]^{+}_v=-\big(\hat{\partial}^{\lambda}(\check{\partial}^{\lambda}-\check{\partial}_{\lambda})\big)^{-}_v \qquad :\{\phi^{-},V^{+}\} \tag{18.1}$$

$$\left[\check{\partial}^{\lambda}\check{\partial}^{\lambda},\hat{\partial}_{\lambda}\hat{\partial}_{\lambda}\right]^{-}_v=-\big(\hat{\partial}_{\lambda}(\check{\partial}^{\lambda}-\check{\partial}_{\lambda})\big)^{+}_v \qquad :\{\phi^{+},V^{-}\} \tag{18.2}$$

where the index v refers to the vector potentials. The first equation is the physical dynamics of cosmology, and the second equation is the virtual motion dynamics.

Artifact 18.1: Y^{-} Cosmic Dynamics. Aligning with the continuously arising horizons, the events determine the derivative operations through the vector potentials giving rise to the matrix fields for further dynamic evolutions at the Y^{+}-supremacy. From definitions of the *Lorentz-matrices* (8.13-8.14) [2], one can convert the right-side equation (18.1) of the asymmetric vector entanglers explicitly into the following formulae, similar to the derivation of equation (17.7):

$$\Lambda^{+\sigma}_{\nu\mu}=\Lambda^{+}_d-\kappa^{+}_{\Lambda}\begin{pmatrix}-(\mathbf{u}^{+}\nabla)\cdot\mathbf{D}^{*}_v\\ \frac{\partial}{\partial t}\mathbf{D}^{+}_v+\frac{\mathbf{u}^{+}}{c}\nabla\big(\frac{\mathbf{u}^{+}}{c}\times\mathbf{H}^{+}_v\big)\end{pmatrix} \tag{18.3}$$

where κ^{+}_{Λ} is a constant, the lower index v indicates the vector potentials, the $\mathbf{D}^{*}_v$, $\mathbf{D}^{+}_v$ and $\mathbf{H}^{+}_v$ fields are the intrinsic modulations in the form of a duality of asymmetry cohesively. The $\Lambda^{+\sigma}_{\nu\mu}$ is the Y^+ cosmological modulator that extends the classic cosmological constant to the matrix. Illustrated by equations of (16.27), the motion dynamics can now be fabricated in the covariant form of asymmetric equation:

$$\mathscr{R}^{-\sigma}_{\nu ms} + \Lambda^{+\sigma}_{\nu m} = \frac{R}{2} g_{\nu m} + G^{s\sigma}_{\nu m} + C^{s\sigma}_{\nu m} \qquad \textbf{(18.4a)}$$

$$\mathfrak{R}^- + \mathbf{\Lambda}^+ = \frac{R}{2}\mathbf{g}^- + \mathbf{G} + \mathbf{C}^- \qquad : \mathbf{\Lambda}^+ \equiv \Lambda^{+\sigma}_{\nu m} \qquad \textbf{(18.4b)}$$

The *Riemannian* curvature $\mathfrak{R}^- \equiv \mathscr{R}^{-\sigma}_{\nu m\mu}$ associates the metric $\mathbf{g}^-$, relativistic stress $\mathbf{G}$ and contorsion $\mathbf{C}$ tensors to each world-line or spacetime points of the Y^- manifolds that measures the extent to the metric tensors from its locally isometric to its opponent manifold or, in fact, conjugate to each other's metric. Apparently, the dark dynamics is the sophisticated processes with the message transformations, relativistic commutations, and dynamic modulations that operate the physical motion curvature. This equation servers as *Law of Conservation of Y^- Cosmological Motion Dynamics*, introduced at 17:16 September 7th 2017 that the Y^- fields of a world-line curvature are constituted of and modulated by asymmetric fluxions, given rise from the Y^+ vector potential fields not only to operate motion geometry, but also to carry out messages for reproductions and animations. It implies that the virtual world supplies energy resources in the forms of area fluxions, and that the cosmological modulator $\mathbf{\Lambda}^+$ has the intrinsic messaging secrets of the dark energy operations, further outlined in the following statement:

1) During the Y^-Y^+ entanglements between the world planes, the asymmetric potentials dynamically operate spacetime curvatures $\mathfrak{R}^-$ and supply the area energy at a horizon rising from symmetric fluxions of vector potentials.
2) The Y^- motion curvature $\mathfrak{R}^-$, stress $\mathbf{G}$ and contorsion $\mathbf{C}$ dynamically balance the transformation and transportation through the asymmetric fluxions entangling between the dual manifolds.
3) The Y^- asymmetric motions are internally adjustable or dynamically operated through the potentials of the Y^+ modulator $\mathbf{\Lambda}^+$ through the energy fluxions. In other words, a cosmic system is governed by the modulator $\mathbf{\Lambda}^+$ symmetrically and the commutation asymmetrically.
4) The $\mathbf{\Lambda}^+$ modulator evolves, generates and gives rise to the further horizons which integrate with the dynamic forces, motion collations, or symmetric entanglements.
5) Remarkably as its resources of symmetric counterpart, it associates the diagonal components that embed and carryout the horizon radiations, wave transportations, as well as the force generators spontaneously.
6) The trace of moderation tensor $Tr(\mathbf{\Lambda}^+)$ might be observable externally and might be dependent to the frequency and temperature $\Lambda_d(\omega, T)$ in a free space. As expected, the smaller the Λ_d as a constant, the greater stability the universe.
7) Besides, the strength $\mathbf{D}^+_\nu$ and twisting $\mathbf{H}^+_\nu$ fields of the asymmetric $\mathbf{\Lambda}^+$ components are a part of the propagational entanglements throughout the system intrinsically, resourcefully, modularly, and gracefully.

Usually, the matrix $\mathbf{\Lambda}^+$ institutes dynamic modulations internally while its asymmetric area fluxions and the reactors are observable externally to the system.

Artifact 18.2: Y^+ Cosmic Dynamics. In a parallel fashion, by following the same approach, we can fabricate compactly the contravariant formula at the Y^--modulation and its conservation inherent in the *Virtual Dark Dynamics*.

$$\tilde{\mathscr{R}}^{+\sigma}_{\nu m\mu} + \Lambda^{-\sigma}_{\nu m} = \tilde{R}_{\nu m} + \tilde{G}^{\sigma s}_{\nu m} + \tilde{C}^{\sigma s}_{\nu m\mu} \qquad \textbf{(18.5a)}$$

$$\tilde{\mathfrak{R}}^+ + \mathbf{\Lambda}^- = \tilde{\mathbf{R}} + \tilde{\mathbf{G}} + \tilde{\mathbf{C}} \qquad : \mathbf{\Lambda}^- \equiv \Lambda^{-\sigma}_{\nu m} \qquad \textbf{(18.5b)}$$

$$\Lambda^{-\sigma}_{\nu m} = \Lambda^-_d - \kappa^-_\Lambda \begin{pmatrix} -(\mathbf{u}^-\nabla)\cdot \mathbf{B}^*_\nu \\ \frac{\partial}{\partial t}\mathbf{B}^-_\nu + \frac{1}{c}\mathbf{u}^-\nabla \times \mathbf{E}^-_\nu \end{pmatrix} \qquad (18.6)$$

where κ^-_Λ is a constant, the $\mathbf{B}^*_\nu$, $\mathbf{B}^-_\nu$ and $\mathbf{E}^-_\nu$ fields are the intrinsic modulations in the form of a duality of asymmetry cohesively. The matrices are associated with the *Lorenz*-group at the third or higher horizon. The above equation also serves as *Law of Conservation of Y^+ Cosmological Field Dynamics* that associates curvature, stress and contorsion with commutator of area fluxions:

1) At a horizon rising from commutations of vector potentials, this equation describes the outcomes between the internal entanglements and motion behaviors observable externally to the system though the Y^- modulation $\mathbf{\Lambda}^-$ of the activator.
2) The motion annihilation of metric $\mathbf{g}^+$, stress $\tilde{\mathbf{G}}$ and connector tensors $\tilde{\mathbf{C}}$ conserve the *Riemannian* curvature $\mathfrak{R}^+$ travelling over the world lines or spacetime and entangling through the actor $\mathbf{\Lambda}^-$ matrix between the Y^-Y^+ manifolds at the third or higher horizons.
3) The Y^+ motion curvature $\mathfrak{R}^+$, stress $\tilde{\mathbf{G}}$ and contorsion $\tilde{\mathbf{C}}$ dynamically balancing the transportation through the asymmetric fluxions may radiate the lightwaves, photons and gravitons associated with its symmetric counterpart.
4) The fluxion is entangling the vector potentials to propagate the resource modulator $\mathbf{\Lambda}^-_\nu$ of the asymmetric strength $\mathbf{B}^-_\nu$ and twisting $\mathbf{E}^-_\nu$ fields, conservatively and consistently.
5) The internal continuity of energy fluxion might be hidden and convertible to and interruptible with its Y^+ opponent fields for the dynamic entanglements reciprocally throughout and within the system.
6) The $\mathbf{\Lambda}^-_d$ is asymmetric fluxion for the force generator or energy emissions, classically known as the spontaneous symmetry breaking. As expected, the symmetry can be evolved gracefully for activities such that the entire system retains symmetry.
7) The asymmetric strength $\mathbf{E}^-_\nu$ and twisting $\mathbf{B}^-_\nu$ fields of the off-diagonal $\mathbf{\Lambda}^-$ components are a part of the propagational entanglements throughout the system intrinsically, resourcefully, modularly, and gracefully.

At the Y^--supremacy, the asymmetric forces or acceleration is logically affiliated with the *virtual dynamics* while its physical motion curvature is driven by the Y^+-supremacy of the virtual world.

Artifact 18.3: Cosmological Accelerations. For the accelerations at non-zero $\mathbf{g}^\pm_\nu \neq 0$, one has the following expression, similar to (17.16-17.17) of the ontological accelerations:

$$\mathbf{g}^-_\nu/\kappa^-_g = \left[\check{\partial}^\lambda\check{\partial}^\lambda, \hat{\partial}_\lambda\hat{\partial}_\lambda\right]^-_\nu - \mathbf{\Lambda}^+ \qquad : \kappa^-_g = \frac{\hbar c}{2E^-} \qquad (18.7)$$

$$\mathbf{g}^+_\nu/\kappa^+_g = \left[\check{\partial}_\lambda\check{\partial}_\lambda, \hat{\partial}^\lambda\hat{\partial}^\lambda\right]^+_\nu - \mathbf{\Lambda}^- \qquad : \kappa^+_g = \frac{\hbar c}{2E^+} \qquad (18.8)$$

where $\mathbf{g}^-_\nu$ or $\mathbf{g}^+_\nu$ is a normalized acceleration of cosmology. As a duality, a galaxy center may have a mixture of a black core absorbing objects and a white core radiating the photons and gravitons. For a blackhole, its core center may absorb the objects in order to maintain its activities for its motion stability of annihilation. Reciprocal to a blackhole, a galaxy center may have more radiations instead of absorbing objects, which results in a brightness of its core to stabilize its highly functioning activators and operating modulators - the nature of the mysterious dark energy.

Artifact 18.4: Spacetime Horizon Equations. Since the cosmic dynamics at the third horizon is on spacetime manifold with four-dimensional coordinates, the FLRW metric in *Cartesian* coordinates has the *Riemann* curvature tensor at the components of the *Ricci* tensor:

$$R_{00} = -\frac{3}{c^2}\frac{\ddot{a}}{a}g_{00}, \qquad R_{0\nu} = 0 \qquad (18.9)$$

$$R_{\mu\nu} = \left[\frac{1}{c^2}\frac{\ddot{a}}{a} + \frac{2}{c^2}\left(\frac{\dot{a}}{a}\right)^2 + \frac{2k}{a^2}\right]g_{\mu\nu} \qquad (18.10)$$

where as expected the isotropy and homogeneity of our metric leads to the vanishing of the vector $R_{0\nu} = 0$ and forces the spacial part to be proportional to the metric $R_{\mu\nu} \propto g_{\mu\nu}$. The *Ricci* scalar is given by

$$R = -6\left[\frac{1}{c^2}\frac{\ddot{a}}{a} + \frac{1}{c^2}\left(\frac{\dot{a}}{a}\right)^2 + \frac{k}{a^2}\right] \qquad (18.11)$$

The energy momentum tensor $T_{\mu\nu}$ is similarly constraint as the *Ricci* scalar. It can only contain two independent functions of t and its components are

$$T_{00} = \rho_0(t), \quad T_{0t} = 0, \quad T_{\mu\nu} = p_0(t) g_{\mu\nu} \tag{18.12}$$

$$G_{tt} = \frac{8\pi G}{c^2}\rho_0 \qquad G_{rr} = \frac{8\pi G}{c^2} p_0 \tag{18.13}$$

From the equation (18.4), it can be extracted and shown by the following:

$$H_2^2 + \frac{kc^2}{a^2} = c^2\Lambda_{tt}^{+} + \frac{4\pi G}{3}\rho \qquad : \rho = 2\rho_0 + \rho_{tt} \tag{18.14}$$

$$3H_2H_3 = c^2\Lambda_{rr}^{+} - \frac{4\pi G}{c^2}(\rho c^2 + 3p) \qquad : p = 2p_0 + \frac{1}{3}p_{rr} \tag{18.15}$$

$$H_2 = \frac{\dot{a}}{a}, \quad H_3 = \frac{\ddot{a}}{\dot{a}}, \quad \Lambda_{tt}^{+} = \Lambda_{00}^{+\sigma}, \quad \Lambda_{rr}^{+} = \Lambda_{\nu\nu}^{+\sigma}(\nu > 0) \tag{18.16}$$

where H_2 or H_3 is named the second or third horizon function of spacetime manifolds, respectively. Representing the arisen ratios, these horizon functions extend the classical *Hubble* parameter H_2 into a hierarchy of the natural topology of universe. Named as *Spacetime Horizon Equations*, it serves as conservation of the third horizon and extends the *Friedmann* equations in to a duality of virtual-physical reality, shown as below:

$$\nabla \cdot \mathbf{D}_v^{*} = 4\pi G \rho_v \tag{18.17}$$

$$\frac{\partial}{\partial t}\mathbf{D}_v^{+} - \nabla \times \mathbf{H}_v^{+} = 4\pi G \mathbf{J}_v^{+} \qquad : p_v = p_{tt} + p_{rr} = c^2 Tr(\mathbf{J}_v^{+}) \tag{18.18}$$

Because, the *Horizon Equations* are a collection of the *complex states*, it implies an eternal yinyang-steady state universe that, remarkably, the dark energy operates the resources and modulates the motion dynamics in form of the physical mass, virtual-energy density, photon, graviton, thermodynamics, weak and strong forces, packed all together. Therefore, the equations (18.14-15) are contradict to the hypothesis that the universe described by the equation (16.39) implies abrupt appearance of expanding spacetime metric.

Artifact 18.5: Cosmic Redshift. At the second horizon, the electromagnetic radiation is neglectable for photon emissions (Artifact 14.5). The lights wave emissions are predominantly at the second horizon, where the redshift becomes irrelevant to the motion dynamics of a physical object at the third horizon. This is contradict to the hypothesis that universe is expanding from the primordial "Big Bang". In fact, the redshift implies the dark energy was and has been continuously operating the physical dynamics at the ontological regime, a process of which is always accompanied by radiations of lightwaves and emissions of gravitations. As expected, the wave dispersion is equivalent to or always "expanding" that is the known characteristics of the virtual world imposing or exposing on the physical world.

In case of the spacetime redshift, the emitting object appears as expanding due to the energy conversion between the physical and virtual regime with time-lapse and wave dispersion. This is not a Doppler-like effect [11] relevant to the speed of the galaxy or star without changing dynamics of cosmological continuity over world-planes [12]. Because the rate of action time changes or "expends" between the transmission, it will affect the received wavelength under the different scope of regime. Apparently, the spacetime redshift is a measure of the conservation that the universe has undergone between the virtual time when the light was effectually emitted and the real space when it is physically received.

Besides the cosmic redshirt between the light emitting and receiving, a property of the mass annihilation or inauguration has no-singularity in the virtual event operations of the universe (artifact 7.4). The entire universe is orchestrated as a whole rather than a phenomenon that applies just to one part of the universe or from the physical observation only. Therefore, our astronomers shall bid farewell to the model of "Big Bang theory".

CONCLUSIONS

In summary, asymmetric dynamics is the resources or modulators of motion entanglements for ontological evolutions and spacetime curvatures for cosmological events. Generally, it is the virtual world that dominants our universal topology or world activities for creations and annihilations, and that the physical world for reproduction and animations. No dynamics can sustain without its reciprocal counterpart, although it might be hidden or appear as dark energy to the physical observers. In fact, the acceleration forces of the physical curvature, stress and contorsion are operated by virtual supremacy of modulations internally. Apparently, since the motion dynamics of the Y^- (17.5-17.6) or Y^+ (18.4, 18.5) equations is associated with its opponent Y^+ or Y^- modulator, a natural being has its dynamic life characterized and modulated by the Y^-Y^+ entanglements.

REFERENCES

1. Einstein, Albert. "The theory of relativity" 1949, "On the Generalized Theory of Gravitation" 1950, http://www.relativitybook.com/einstein_quotes.html
2. Xu, Wei (2017) Topological Framework, World Equations and Universal Fields. viXra:1709.0308
3. Xu, Wei (2017) Quantum Field Generators of Horizon Infrastructure. viXra: 1709.0358
4. Xu, Wei (2017) General Symmetric Fields of Gravitation, Electromagnetism and Thermodynamics. viXra:1709.0385
5. Petersen, Peter (2006), Riemannian Geometry, Berlin: Springer-Verlag, ISBN 0-387-98212-4
6. Einstein, Albert (1916). "The Foundation of the General Theory of Relativity". Annalen der Physik. 354 (7): 769.
7. Friedrich W. Hehl, Yuri N. Obukhov (2007) "Elie Cartan's torsion in geometry and in field theory, an essay", arXiv:0711.1535
8. Hubble, E. (1929). "A relation between distance and radial velocity among extra-galactic nebulae". Proceedings of the National Academy of Sciences. 15 (3): 168–73.
9. Misner, Charles W.; Thorne, Kip. S.; Wheeler, John A. (1973), Gravitation, W. H. Freeman, ISBN 0-7167-0344-0
10. Lee, J. M. (1997). Riemannian Manifolds – An Introduction to Curvature. Springer Graduate Texts in Mathematics. 176. New York Berlin Heidelberg: Springer Verlag. ISBN 978-0-387-98322-6
11. Buys Ballot (1845). "Akustische Versuche auf der Niederländischen Eisenbahn, nebst gelegentlichen Bemerkungen zur Theorie des Hrn. Prof. Doppler (in German)". Annalen der Physik und Chemie. 11 (11): 321–351.
12. R. Gray, J. Dunning-Davies (2008) "A review of redshift and its interpretation in cosmology and astrophysics", arXiv:0806.4085
13. Friedman, A. (1922). Über die Krümmung des Raumes. Zeitschrift für Physik, 10, 377-386.